INSTITUTE *of* STATISTICS
Oxford

Bulletin Vol. 13 *July, 1951* *No. 7*

THE ACCURACY OF PRE-ELECTION POLLS

I. BACKGROUND

'If there were a General Election to-morrow, how would you vote ?' Growing interest is being displayed towards the answers which public opinion polls are getting to this question to-day. Ever since the Labour Party secured an uneasy Parliamentary majority in February, 1950, there has been lively speculation over the date of the next General Election and about its outcome. Opinion polling agencies have fed this debate with periodic figures on how the nation's vote might since have divided between the principal parties. Their activities are now being intensified in keeping with the party struggle in the House of Commons. The *News Chronicle*, long a supporter of the British Institute of Public Opinion, at present publishes the findings of a fortnightly election poll. The *Daily Express*, too, now has its own polling organization to record the state of party support. One year after the Labour party was returned to Parliament with its present narrow majority the public opinion polls were reporting a substantial defection from the ranks of its supporters; an election in February 1951, it was claimed, would have produced a 13 per cent Conservative lead over Labour in the total vote.

How reliable is an indication of this kind ? Party strategy is undoubtedly influenced by it. And yet misgivings are felt at accepting figures whose significance, dependent on the mysteries of polling techniques, cannot be clearly appraised. Sooner rather than later the present uneasy balance between the two main parties in Parliament will have to be resolved and another General Election will then be imposed on the country. When that happens the public opinion polls will come even more fully into their own. It will be as well to understand in advance exactly what their self-appointed task is.

In the United States the cloud that fell over Dr. Gallup and his associates after their dismal failure to forecast the party split at the Presidential election of November, 1948, has now largely lifted. The reputation of the polls was damaged, not destroyed. The rapid approach of the next Presidential election in 1952 is again reviving American interest in election polls and there, too, they are soon destined to attract a fuller measure of public attention.

This would therefore seem the appropriate time to consider afresh just how much faith may be placed on the findings of election polls. Much has already been written on this subject.[1] In adding to that literature the present article confines itself to a study of the election polls in the United Kingdom and the United States and only to the last two elections in each country : the two post-war ones of 1945 and 1950 here, and those of 1944 and 1948 in the States. Moreover, although there are a number of polling agencies in both countries, illustrations are drawn only from the two associated with Dr. Gallup : the American Institute of Public Opinion and its affiliate in this country, the British Institute of Public Opinion under Dr. Durant. Finally, this article does not attempt any exhaustive survey; it is concerned with the problem of accuracy, concentrates on those aspects of it which would appear to have been neglected in the past, and therefore skims very lightly over some topics while delving disproportionately deeply into others.

---

[1] The *Public Opinion Quarterly* (P.O.Q.) and the *International Journal of Opinion and Attitude Research* (I.J.O.A.R.), each carried a special symposium of articles on election polls during 1949.

II. Scope and Limitations of Election Polls

There is one thing the polling agencies are not qualified to do, do not attempt, and yet are thought by the public to do : that is, to predict the outcome of elections. There is another which they are not qualified to do but nevertheless attempt : that is, to predict the way in which the national vote will split between the contesting parties on election day. Strictly speaking the polling agencies should not predict anything; all they are qualified to do is to report what eligible voters say their voting behaviour will be on election day.

Even assuming that the polling agencies are qualified to forecast how the national vote will split, as indeed is their assumption, that is a very different thing from picking the winner of the election, be it a party or the President. In both the countries considered the electoral systems are such that a party may well receive less votes than its principal rival and yet win the election; in the one case by capturing a majority of seats in the House of Commons, in the other by leading in sufficient States to ensure a majority of votes in the Electoral College. Thus the Labour party won more seats than the Conservatives in the 1929 election although it secured fewer votes. In America Harrison, the successful Republican candidate in 1888, polled fewer votes than his Democratic opponent.

The problem of relating seats to votes has attracted attention in this country in recent years. As a rough and ready relationship the Cube Law, applicable to two-party contests and first propounded at the turn of the century, has been found to apply with surprising accuracy to British elections since 1931.[1] According to this law, if votes divide between the two contesting parties in the ratio A : B (or are so predicted to divide by a pre-election poll), then seats in the House of Commons will divide in the ratio $A^3 : B^3$. A more elaborate relationship depends on shifts in party support since the previous election.[2] The assumption is roughly that an overall swing from party A to party B of x per cent of the national vote (as calculated from the current election poll and the result of the previous election) will transfer as many seats from A to B as the former won at the previous election by margins of x per cent and less over the latter.

---

[1] The rediscovery of the Cube Law was first described in *The Economist* of January 7th, 1950. For a general discussion of it see ' The Law of the Cubic Proportion in Election Results,' by Kendall and Stuart, *British Journal of Sociology*, Vol. 1, No. 3, 1950.

[2] Appendix 3, by D. E. Butler, to *The British General Election of* 1945, by McCallum and Readman, O.U.P. See also the appendix, by the same author, to *The British General Election of* 1950, by H. G. Nicholas, Macmillan.

But a public opinion poll is not even a sufficient tool for predicting the way the national vote will split between contesting parties on election day. All it alone can do is record people's answers to whatever questions are asked. In translating, with the aid of their own judgement, what people say about their voting intentions into a forecast of how the nation will vote, the polling agencies are gambling on their own success. If the gamble comes off, and the prediction is reasonably accurate, it will enhance the standing of their other polls for whose findings there is no outside check. If it does not, and their prediction is falsified, they hope to blame the failure on factors outside their control : after all, they could argue, it was the voters who were at fault for changing their minds; they, the polling agencies, had faith in what the voters told them.[1]

Whether the polling agencies should ever make this translation and predict what the vote will be at a forthcoming election is largely an academic issue. In practice public interest has by now been sufficiently aroused to make it more than likely that polling agencies will continue to make election forecasts. It is the more necessary, therefore, to understand the processes involved and the kind of accuracy that may be expected from them.[2]

This article approaches the question of accuracy in two ways. The simpler is the empirical or ex-post approach which compares past predictions with subsequently recorded results. Its conclusions relate to the reliability of past and hence future pre-election polls. The other is the analytic or ex-ante approach which seeks to show, by an analysis of the polling process into its significant stages, those points at which the logic of the process is at fault. Its conclusions relate to the validity of the method. Some of the ground is common to the two approaches and an attempt has been made in the discussion which follows to avoid repetition by elaborating arguments only in the more significant of their two possible contexts.

III. The Polls' Reliability

(a) *Results Examined*

A comparison between forecasts and actual results will give a superficial measure of the reliability of the pre-election polls in terms of their apparent error. In the tables below forecasts refer to the latest polls taken before the four elections studied. Figures have been rounded because, to anticipate what should later become clear, the practice of publishing forecasts to one place of decimals is an unjustified pretence to scientific method.

---

[1] Daniel Katz ' Polling Methods and the 1948 Polling Failure ', I.J.O.A.R., Vol. 2, No. 4, Winter, 1948–1949.

[2] A delightful general critique of the American polling agencies is *The Pollsters*, by Lindsay Rogers ; Alfred A. Knopf, New York, 1949.

UNITED KINGDOM	1945		1950	
	Predicted	*Actual*	*Predicted*	*Actual*
	%	%	%	%
Labour	47	48	45	46
Conservative	41	40	43	44
Liberal	10	9	11	9
Other	2	3	1	1
	100	100	100	100
		%		%
All Voters ...		73		84
Non-voters ...		27		16
Total Electorate ...		100		100

UNITED STATES	1944		1948	
	Predicted	*Actual*	*Predicted*	*Actual*
	%	%	%	%
Democratic	52	53	45	50
Republican	48	46	49	46
Other	—	1	6	4
	100	100	100	100
All Voters ...		53		51
Non-voters ...		47		49
Total Electorate ...		100		100

The immediate impression created by these results is one of extraordinary accuracy in predicting proportions of the vote going to the major parties in all but the 1948 election in the United States. Only in that one election did the forecast for a major party depart from the subsequent result by more than 2 per cent of the total electorate. In the United Kingdom the departure was never greater than 1 per cent in either election.

Superficial or net error may of course be defined in many ways. Dr. Gallup himself defines it as: 'the average percentage points of deviation from the actual percentage division of the vote for all candidates or parties (shown) for the electoral unit covered.'[1] On this definition the errors of the United Kingdom predictions were 1 per cent in each election, and of those in the United States were 1⅓ per cent in 1944 and 3⅓ per cent in 1948. This definition is of absolute error; so is that behind any direct comparison between forecasts and results. The direct comparison is probably the fairer of the two since it does not benefit, as does Dr. Gallup's definition, from the narrow margins within which errors in estimating minor parties' support are likely to fluctuate. Some critics of the polls argue that what matters when assessing accuracy is relative error. They would regard the error in estimating a minor party's support at 2 per cent of the national vote when subsequently it receives 4 per cent as 100 per cent. But that is to ignore the limitations of a sample estimate.

---

[1] 'Accuracy of Modern Polling Techniques in Making Election Forecasts,' by Dr. George Gallup; Paper read before the New Haven Chapter, American Statistical Association, April, 1948.

Yet another way of regarding the error of a pre-election forecast is in terms of the percentage margin (defined as half the difference) between the two main parties. This has particular relevance to attempts, such as those described above, to translate votes into seats. A comparison between forecasts and results would then appear as follows :

UNITED KINGDOM	1945		1950	
	Predicted	*Actual*	*Predicted*	*Actual*
Labour margin over Conservative	+3%	+4%	+1%	+1%
UNITED STATES	1944		1948	
	Predicted	*Acrual*	*Predicted*	*Actual*
Democratic margin over Republican	+2%	+3½%	—2%	+2%

It will be seen that the size of errors assumes very much greater significance as a result of this presentation. The margin between the major American parties was almost twice as large in 1944 as predicted. But more important : if one looks at the figures of the later of the two elections in each country as variations from the figures of the earlier elections, then the accuracy of the 1950 predictions in the United Kingdom may be thought of as no less a matter of chance than the inaccuracy of the 1948 prediction in the United States. A relatively good prediction, in other words, may be no more likely than one that is relatively bad; it does not necessarily imply any underlying improvement in the accuracy of polling methods. The 1950 prediction no more guarantees an equally good prediction of the next British election than should Dr. Gallup's good record in the United States up to 1944 have induced uncritical acceptance of his 1948 forecasts.

(*b*) *Net Error and Gross Movements*

One characteristic is common to all the above ways of computing the reliability of pre-election polls. All have been expressed in terms of the apparent or net error : the difference between predicted and actual. The net error is, however, the resultant of a number of gross movements which may, in particular circumstances, assume some special significance. For a proper assessment of the net error it is essential to understand what underlies it.

A preliminary example may make the point clearer. There are 100 en trant for a marathon race; it is estimated at a glance that of 50 standing together 32 are fair-haired; it is subsequently found on enumeration that the true number is 30. The error of the estimate is 2 men. But suppose it were estimated that 32 of the first 50 runners who passed the one-mile post had fair hair and the same were therefore predicted about the first 50 to pass the ten-mile post. Then if the true number of fair-haired among the latter was 30, the error of the prediction would again be 2 men but this time that is only the net apparent error. The first 50 runners to pass the ten-mile post would not necessarily be the same individuals who led before. The net error of 2 men will have been the resultant of three underlying gross changes. First, the original estimate made at the one-mile post may have been wrong; secondly, there will have been a number of fair-haired runners among those who dropped back; and, thirdly, among those who overtook them. An analysis of this kind assumes importance when (as overlooked when making the forecast from the one-mile post estimate) running behaviour happens to be related to hair colour as would be the case, for instance, were the marathon an international event at which the light-haired entrants included a number from a national group reputed for stamina.

Parallel though more complicated, processes of change underlie the net errors of a pre-election poll. In 1950, for example, it was estimated that 45 per cent of voters would support the Labour Party; in fact 46 per cent did. The net error of 1 per cent overlooks gross shifts between forecast and result. First, the estimate may have been faulty. Secondly, some of the 45 per cent who said they intended to vote Labour will, in the event, have voted Conservative; others will have voted Liberal; many will not have voted at all. But, thirdly, compensating Labour votes will have come from some people who said they intended voting Conservative, from others who were intending Liberals and from many who were uncertain or had not intended voting at all. In February 1950 these gross shifts counterbalanced one another to the extent of all but 1 per cent. But it does not follow that they will therefore do so every time.

If errors of estimation are ignored and it is assumed for present purposes that there were only two effective parties at the British General Election of 1945, then shifts in the support for each will have occurred across three frontiers, one being that between the parties and the other two being those between each party and non-voting. (It is assumed that the pre-election forecast will have allocated uncertain votes). The condition for shifts to cancel, for a pre-election poll to be accurate, is that the advantage which one party secures over the other as a result of net movements across the latter two frontiers should be compensated and cancelled by the net movement across the frontier between the two parties. This condition represents the norm when all movements are randomized, and it is therefore approximately satisfied when there is a ' normal election '. But the six gross shifts which take place each way across the three frontiers are not independent. Movements do not take place at random. A normal election, in other words, is as much an exception as is the man whose height is exactly the average of the heights of men in a group to which he belongs.

There are practical as well as abstract reasons why gross movements across frontiers should not be randomized. As regards the non-voting frontiers : in both the United Kingdom and the United States high turn-out is directly correlated with support for the popular party, the Labour party and the Democratic party respectively. These parties have greater appeal for the potential non-voter, particularly so in America. Hence errors in estimating turn-out will affect them more than their rivals. A small underestimation of turn-out among lower income groups in America, for example, would result in a substantial underestimate of Democratic support. As regards the inter-party frontier : if the British polls are accurate in reporting to-day that the Conservatives are leading Labour by about 13 per cent, then the Conservative ranks will contain (or the Labour ranks have lost) many floating voters. Last minute shifts before the next election day may, therefore, show a significant one-way return to Labour.

(*c*) *The Michigan Study*

It will be seen on reference to the tables on page 204, that turn-out is in general much heavier at British elections than at American. In 1945 73 per cent and in 1950 84 per cent of the British electorate registered their votes; in 1944 only 53 per cent and in 1948 only 51 per cent of the adult American population did so. The low American turn-out has led apologists for the American election polls to claim that their forecasting task is the more difficult : that they have to contend with the two-fold problem,[1] first, of estimating who will vote, and, secondly, of estimating how voters will divide between the parties. It is certainly true that American predictions are open to wide margins of error on account of unforeseen turn-out factors. But it is not correct to regard theirs as a two-fold problem. In both countries the polling agencies' single task has been to prodict what the electorate will do; failure to vote is as much an attribute of voting behaviour as is voting for a particular party. Else it could also be claimed that the American polling agencies' two-fold problem is first, to estimate who will not vote Democratic, and, secondly, to estimate how those people will split between Republicans and (mainly) non-voters; likewise for non-Republicans. Unforeseen shifts may cause errors in estimating turn-out but they will, equally, cause errors in estimating the number of supporters for each party. Nor are the former errors necessarily the more important. This is illustrated by a study conducted in the United States.

In October 1948, the Survey Research Center of the University of Michigan had a survey in the field on public attitudes towards American foreign policy. Two questions on voting intentions, incidental to the study, were incorporated in the questionnaire. The sample, though representative, was very small : about 600 interviews spread over the whole United States but in designated homes. After the surprising outcome of the election it was decided to reinterview the same people so as to discover, among other clues to what had happened, ' to what extent voting behaviour differed from pre-election statements of voting intentions.'[1]

---

[1] Report of Technical Committee to the Chairman, Campaign Expenditures Committee, House of Representatives ; H. Res. 551, 1945. This report gives an admirable technical account of Dr. Gallup's polling methods before the 1944 Presidential Election.

The table below summarises, for the four principal intention groups, the Michigan study's findings on this question :

Voting Behaviour	*Voting Intentions* *Democratic*	*Republican*	*Don't Know*	*Won't or Can't Vote*
	%	%	%	%
Voted : Democratic ...	66	14	40	10
Republican ...	5	71	19	5
Other Voters ...	3	2	10	—
Did not vote	25	13	31	84
Not ascertained ...	1	—	—	1
	100	100	100	100
Number of Cases ...	163	170	102	119

Too great reliance should not be placed upon the actual percentage figures though they provide a valuable guide to the shifts which occurred. They indicate that the bulk of those who intended to vote Democratic but who failed to do so, instead did not vote at all. By contrast, intending Republicans who changed their minds drifted about equally into the Democratic and the non-voters' camps. Of those who voted but who had not known for which party they would vote, about two supported the Democrats for every one who voted Republican. The same split appears among those people who had contemplated not voting at all.

These findings were also presented a second way in the report of the Michigan study. All groups were expressed as percentages of the whole population and not, as above, as percentages of its political sub-groups. Democratic and Republican support then appear as on following page.

This form of presentation can be illustrated conveniently as in the attached diagram.

These findings illuminate the gross shifts of support which take place between a pre-election poll and the subsequent election. Taking the figures at their face value, they show that in 1948 shifts of 1 per cent and 4 per cent took place across the inter-party frontier, yielding a net Democratic gain of 3 per cent; that shifts between Democratic support and non-voting were

---

[1] 'A Study of the Presidential Vote, November 1948 ' ; Survey Research Center, University of Michigan, April 1949. The author is indebted to the Center's Director, Dr. A. A. Campbell, for permission to reproduce below certain of that study's findings.

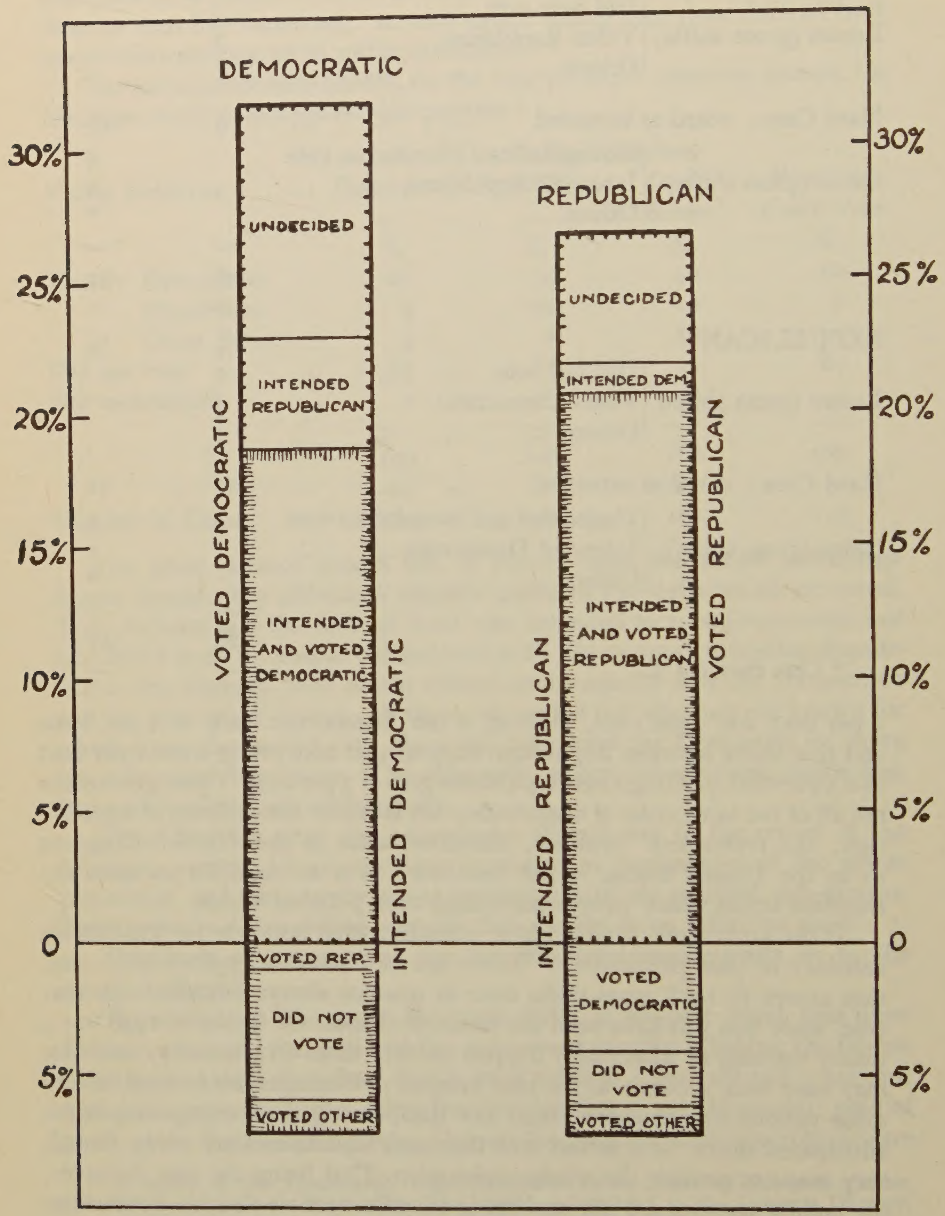
		Per cent of Whole Population	
		Intended	*Voted*
DEMOCRATIC		%	%
Losses (gross shifts)	Did note vote	5	
	Voted Republican	1	
	Others	1	
Hard Core: voted as intended		19	19
Gains (gross shifts)	Undecided and intended no vote		9
	Intended Republican		4
	Others		*
		26	32
REPUBLICAN		%	%
Losses (gross shifts)	Did not vote	2	
	Voted Democratic	4	
	Others	1	
Hard Core: voted as intended		21	21
Gains (gross shifts)	Undecided and intended no vote		5
	Intended Democratic		1
	Others		*
		28	27

* Less than 0.5%.

5 per cent and 9 per cent, yielding a net Democratic gain of 4 per cent; and that shifts between Republican support and non-voting were 2 per cent and 5 per cent, yielding a net Republican gain of 3 per cent. These gross shifts are all of the same order of magnitude; they all affect the accuracy of a prediction; the forecasters' problem, therefore, alike in the United Kingdom as in the United States, is not two-fold. It is as manifold as there are frontiers across which people can change their political minds.

If the forecasters' problem is so complex, what accounts for the relative accuracy of past predictions? There are two possible explanations: one, that except in 1948 gross shifts have in practice always cancelled. In that case, since this will have been the result of chance, the lesson of 1948 was a timely warning of what might happen another time. Or, secondly, estimates may have been accurate in the past because polling agencies learned how to make various adjustments to their raw data, among them extrapolations for anticipated shifts. It is in fact true that such adjustments are made, though they may not provide the whole explanation. That being the case, however, the polling agencies are not justified in advertising their election forecasts as

GROSS SHIFTS OF SUPPORT
U.S. PRESIDENTIAL ELECTION, 1948



public audits of the accuracy of their other polls. This is a serious criticism and demands a closer study of the nature of the adjustments actually made. This is taken up at a later point.

IV. The Polls' Validity

(a) *Ways of Approaching the Problem*

So much for an empirical assessment of the accuracy of public opinion polls concerned with voting behaviour at a forthcoming election. The remainder of this article presents an ex-ante approach to the same problem. This requires an analysis of the technique of poll-taking and the first task is to follow the conduct of an election poll through its significant steps beginning with the selection of a representative sample of the population and ending at the publication of results.

There is no recognized list of the stages involved.[1] At one extreme the work may be regarded as consisting of two operations : field work and the work of processing and analysis carried out at the headquarters office. Errors may be attributed to either operation. At the other extreme the work may be regarded as divided into as many stages as there are hands through which the material passes. Equally an element of error, often merely human, could arise at all points along this chain. An intermediate analysis was that made by the special Committee on Analysis of Pre-election Polls and Forecasts appointed by the American Social Science Research Council to make a post mortem report on the reasons for the failure of the American polls in November 1948. Its preliminary report[2] postulated eight significant steps in the process and, though unable to reach quantitative conclusions, discussed the nature of possible error at each.

There are in fact innumerable ways of analysing the total work involved in the execution of a pre-election poll, each more suited than others to the particular purpose which it is designed to serve. The purpose of the present ex-ante analysis is not to discuss sampling error or reporting error or other specific errors but to assess the validity of pre-election forecasts; this can best be done by splitting the forecasting process into three parts.

It may be useful again to begin with an analogy. Suppose it is required to make a bacteriological test on the milk contained in a churn in, advisedly, a hot climate; the purpose being to assess its fitness for consumption at some later time. The first step would be to sample the milk in that churn by drawing from it (in theory) random elements, hot and cold, rich and dilute, which together are representative of its whole contents. Once a representative sample of milk has been extracted, the second task would be to make appropriate measurements of it and organize them in relation to a pre-conceived structure of questions. Thirdly, with that information to hand, there remains the paper task of forecasting from it what the condition of the milk contents of the whole churn will be at some later hour.

---

[1] But see W. E. Deming 'On Errors in Surveys ' ; *American Sociological Review*, Vol. IX, No. 4, August 1944.

[2] Reprinted in the *Public Opinion Quarterly*, Vol. 12, No. 4, Winter 1948–1949. The Committee's full report ' The Pre-Election Polls of 1948 " was subsequently published as S.S.R.C. BULLETIN No. 60. It gives an exhaustive account of the 1948 fiasco.

In exactly the same way the conduct of an election poll may be regarded as composed of three separate operations: first, the sampling; secondly the extracting of information from respondents (the people interviewed) and its organization; thirdly the projection of that information in relation to a future date. The validity of the forecasting process may be challenged at each point.

(*b*) *The Sampling Operation*

It has been said that a public opinion poll records the preferences of an electorate more accurately than does the subsequent voting because it covers all adults including those who do not vote on election day.[1] The counter-argument is that by not voting people disenfranchise themselves from having a say in their country's policies; they should, therefore, be excluded from the poll sample as well. Whatever the merits of this argument it raises an important question: what is the appropriate population to sample for a pre-election poll?

To make the task of forecasting an election result both simple and plausible the population to be sampled should, ideally, consist only of those people who will vote on election day. This population is, however, indeterminate in advance. At second best the population should contain only those who are eligible to vote; in the United States a substantial number of adults are debarred; as by poll tax obligations in Southern States. In that country, therefore, the respondent must first be asked whether he intends to vote; if he says he cannot or will not he is subsequently dropped in the analysis of sample returns. But as the findings of the Michigan study suggest, many people who give this answer do in fact cast their vote, and they would appear to divide between the contesting parties in proportions different from those of other voters. To exclude them from forecast calculations might introduce bias. Equally, some people who state positive voting intentions in America turn out to be ineligible to vote. In practice, therefore, the population of which the pre-election sample is representative is a rather ragged concept.[2]

But the more serious criticism of the sampling operation refers to the way in which respondents are selected. Election polls in the United Kingdom, and the articulate majority of those whose results are published in the United States, employ the quota method of selection. In this type of sampling, interviewing points throughout the whole country are selected at random at the polling agency headquarters. Interviewers are then instructed to contact a specified quota of respondents at each of those points. They may be told, for example, to interview twelve people of whom six should be men and six women; the twelve should represent the same proportion of old and young people as there are in the whole population, of rich and poor, and so on.[1] One drawback of this system is that the control quotas may well be out of date since they derive from the known composition of the population as reported at the previous census, taken perhaps as long as ten years before.[2] Thus, even if interviewers exactly fill their assigned quotas, the cross-section so selected may not be representative of the contemporary population. But the principal drawback of the quota system is that the final selection of respondents at each sampling point is left to the discretion of individual interviewers. Quite apart from dishonesty this results in a very definite bias. For, however carefully briefed, interviewers tend in practice to select average respondents and to shy away from the extremes of their prescribed ranges. This shows up particularly in the case of characteristics like income and education which are, of course, correlated. Rich people are less easy to contact, being less inclined to spare time to answer questions; very poor people are less inviting of approach. This is aggravated by the fact that interviewers themselves tend to be drawn from middle income groups. Most are part-time workers and the majority are women. They are most at ease talking to people like themselves. As a result, the quota sample is not accurately representative of the population being studied. And since in the typical society there are relatively few wealthy people and relatively many in lower income groups the principal bias resulting from quota sampling is the under-representation of lower socio-economic groups.

---

[1] E.g. by L. P. Crespi: 'Elections and Poll Validity'; I.J.O.A.R., Vol. 2, No. 4, Winter, 1948–1949.

[2] Cf. Elmo Roper: 'Some Comments on Election Polls'; I.J.O.A.R., Vol. 3, No. 1, Spring 1949.

In turn, these lower socio-economic groups tend to vote predominantly for one political party rather than for others : the Labour party in the United Kingdom and the Democratic party in the United States.[3] It may therefore be expected that pre-election polls based on quota sampling would consistently underestimate the strength of these parties. This hypothesis is supported by the figures shown in the tables on page 204. In every one of the four elections to which the figures refer the polls are seen to have under-estimated support for the popular party. Dr. Durant's prediction for Labour in 1945 was 47 per cent; actual support was 48 per cent. Corresponding figures in 1950 were 45 per cent and 46 per cent. In 1944 Dr. Gallup predicted that the Democrats would get 52 per cent of the total vote; they subsequently received 53 per cent. And in 1948 the under-estimation was particularly marked : 45 per cent predicted, 50 per cent actual. The fact that all these four predictions erred in the same direction is no accident, however complex the full explanation for it. Furthermore it was no accident that Dr. Gallup under-estimated Democratic strength in 42 out of the 44 State by State predictions which he attempted in 1948.[4] Nor is it an accident that in both 1940 and 1944 he underestimated Democratic strength in two-thirds of all his State-by-State predictions.

---

[1] But it has been suggested that Gallup's quota controls were little better in 1948 than 'suggestions to interviewers'. A. A. Campbell : 'The Pre-Election Polls of 1948,' I.J.O.A.R., Vol. 4, No. 1, Spring 1950.

[2] See, for example, A. R. Blankenship 'What Happened to the Polls' ; I.J.O.A.R., Vol. 2, No. 3, Fall 1948.

[3] Not quite true of 1948 when Wallace's Progressive Party attracted part of this vote.

[4] All except Tennessee and Texas. The remaining four were Southern States ; effectively uncontested.

This weakness of quota sampling has long been recognized and has been systematically studied, particularly in the United States. There is evidence to suggest that in America the lower socio-economic groups of the population may be under-represented by as much as 12–20 per cent in a quota sample.[1] The corresponding figures may not be as high in the United Kingdom though the same bias undoubtedly exists. It may therefore be asked why a bias of this magnitude does not consistently produce errors as large as those of 1948 and why the net error in estimating Labour or Democratic support was only 1 per cent in each of the other three elections described above. The answer is that the quota polls normally rely on their sampling bias being compensated and nullified by bias of another kind. This is the tendency, already pointed out, of lower income groups to turn out on election day less heavily than other groups of the population. The polling agencies have made the implicit assumption that it does not matter if their quota samples under-represent the lower socio-economic strata of the population if and because they subsequently under-represent themselves to the same extent by lower turn-out at the voting booths. The quota sample, it would be claimed, automatically becomes a relatively accurate cross-section of the population of actual voters.

As long as the factors which justify this assumption remain constant from one election to the next its impact may be obscured. The danger which polling agencies face is that those factors may change and that, moreover, such changes only become evident to post-election hindsight. One of the causes contributing to the American polls' failure in 1948 is likely to have been just this, that the expected compensation did not materialise on November 2nd. Labour groups were given special incentives to vote by virtue of the Democratic party's promises of price and rent controls and the repeal of the Taft-Hartley Act which the Unions had strongly publicised; they may therefore have turned out to vote more heavily than anticipated and in greater strength than the quota polls had sampled them. Democratic promises of farm price supports, in contrast to Republican silence, may also have attracted many insecure rural votes.

Although turn-out is much heavier in the United Kingdom among all income groups of the adult population a similar compensation of opposing biases also underlies the past accuracy of election predictions in this country. There is always a danger that some change of circumstance may upset the compensation at a future British election. Sampling by the quota method in both countries at best produces forecasts of precarious accuracy.

(*c*) *Value of the Information Elicited*

The second point at which the question of validity arises in a particularly significant way is in the extraction of information from respondents. In the analogy of testing milk this is the point in the process at which measurements are taken of the characteristics of the sample drawn from the churn. In both cases raw data alone have little meaning until they are organised into some summary form. The main characteristics which the public opinion polls try to measure when they forecast an election result is voting intention and they do this by means of questions like ' how will you vote ? '

---

[1] Daniel Katz ' Do Interviewers Bias Poll Results ? ' ; P.O.Q., Vol. VI, 1942. See also ' The Polls and the 1944 Election,' by the same author ; P.O.Q., Vol. VIII, 1945.

The view taken here is that answers to this question are fundamentally invalid for two independent reasons : the first, that they are given without obligation; the second, that in the simple form in which they are recorded—Labour, Conservative, Democratic, Republican, Don't know, and so on—they cannot adequately represent the potential voter's true stand among the complex of alternative voting behaviour at his disposal.

Intentional insincerity is undoubtedly encountered among answers recorded by public opinion polls, though on a scale not likely to lead to significant distortion. What is more important is unintentional insincerity.[1] This is prevalent whenever superficial answers are acceptable, whenever intensity of view goes unrecorded or whenever, and this is particularly relevant to pre-election polls, the respondent is under no obligation to suit later action to present words. A man is bound by his answer to the question ' wilt thou take this woman . . . ? ' but he is not required to implement on election day the voting intention he expresses to an interviewer several days or even weeks beforehand. Unintentional insincerity among recorded answers is a recognised criticism of most opinion and attitude polls. In its present context it may be regarded as an analytic restatement of the empirical evidence, earlier described at some length, that a substantial proportion of the people interviewed before an election will have changed their minds by election day. The arguments need not be repeated here. The present section, therefore, concentrates attention on the second reason why answers to questions of the form ' how will you vote ? ' leave much to be desired.

It is a familiar psychological argument that no two men behave the same way for exactly the same set of reasons. No two men apply identical values and similar experience to their resolutions of the same problem. So, too, with decisions on how to vote at a forthcoming election. In order to predict a man's voting behaviour with a fair degree of confidence it is really advisable to study him carefully and discover his previous voting behaviour, his stand on the political issues connected with the election, his appraisal of the candidates and many other of his political characteristics. Every respondent selected by a pre-election poll should, ideally, be subjected to lengthy interrogation under conditions of confidence and ease.[2] Even then a subsequent and unforeseen political event might belie conclusions reached about him.

---

[1] Cf. Robert Cobb Myers ' Vital Part of the Poll Question,' *New York Times Magazine*, January 2nd, 1949.

[2] Cf. Helen Dinerman, ' 1948 Votes in the Making, a Preview,' ; P.O.Q., Vol. 12, No. 4, Winter 1948–1949.

Instead of this, however, the polling agencies are obliged to base their forecasts on superficial answers to one principal question asked by fleeting strangers. They ignore shades and intensities of political feeling. A man is not regarded as a Labour supporter with growing sympathy for the Conservative cause, or as politically distinterested though inclined towards the Liberal Party; he is classified by the public opinion polls simply as an intending Labour supporter, an intending non-voter or whatever the case may be. The polls, in short, prescribe a battery of pigeon holes—one for each of the contesting parties, one for the undecided and one for intending non-voters—and assume that all respondents may safely be distributed among them. This treatment raises a number of problems, among them the adequacy of the battery of pigeon holes, and in particular whether the single question ' how will you vote ? ' permits an adequate analysis of those respondents who say their voting intentions are as yet undecided. It is here suggested that the undecided comprise a number of very distinct sub-groups and that the polls lose much of their validity as long as these sub-groups remain undifferentiated.

This contention can best be illustrated by reference to the conditions which obtained in the United States in 1948. Let it first again be assumed for the sake of simplicity that only two parties were contesting the Presidential election of that year so that respondents eligible to vote could only answer the interviewer in four ways : that they were intending to vote Democratic or Republican or that they were undecided, or that they were not intending to vote at all. Now traditionally public opinion polls have tended to ask two kinds of questions. One is the alternate choice question to which most respondents answer yes or no, black or white, and so on. The other, a development from this simple case, is the multiple choice question which allows of intermediate answers; opinion on an issue may, for example, be strongly favourable, mildly favourable, uncertain, mildly opposed and strongly opposed.[1] Answers to both types of questions have been regarded as falling on a linear scale between opposing extremes; the more non-committal the answer the nearer its position to the middle of such a scale. Answers which have suggested non-involvement in the question—usually described as ' no opinion '—have been thought of as comprising a separate group extraneous to that scale. The germ of the trouble is that answers to pre-election polls have also been subjected to this type of analysis, implicitly if not overtly. Thus, three of the four possible answer categories in the simplified 1948 example (intending Democrats, undecided voters and intending Republicans) have been regarded as falling on a linear scale between the Democratic and Republican extremes while the fourth category, intending non-voters, has been regarded as extraneous to that scale.

Any such conception is wrong when applied to the analysis of a pre-election poll because it mistakes the true composition of that group of respondents who claim to be uncertain. They fall into three very distinct categories, not one, and all voting intentions should preferably be represented by points on one circular scale; not by a linear scale with an extraneous group. The full range of positions corresponding to people's answers to the question ' how will you vote ? ' should be regarded as beginning, or ending, with the non-involvement position; it shades into the position of uncertainty whether not to vote or vote Democratic; next the Democratic position; followed by that descriptive of people who are undecided between the Democratic and Republican parties; after that the Republican position; it in turn shades into the position of uncertainty between voting Republican or not voting at all; and finally the non-involvement position again.

---

[1] See Hadley Cantril ' Gauging Public Opinion ' (chapter 2) ; Princeton University Press, 1944.

The same analysis applies if the simplifying assumption that there are only two contesting parties is dropped. In that case, since stress should still be laid on the Democratic and Republican parties which between them share the bulk of all votes cast, the non-involvement category ' will not or cannot vote ' may be generalised into ' non-involvement in the Democratic-Republican conflict '; it will then also embrace those who intend to vote for minor parties. Undecided people in the group between the Republican camp and the now generalised non-involvement group will contain those whose choice lies between voting Republican and either not voting at all or voting for a minor party; they are people who would not vote Democratic under any circumstances. Similarly for the intermediate group between the Democrats and non-involvement.

Further justification for this concept of a circular scale may be found on reverting to the earlier ex-post analysis. It was there shown that gross shifts of support take place across frontiers between the different kinds of voting behaviour. These frontiers correspond exactly to positions of uncertainty on the circular scale suggested by the present ex-ante analysis. Not only do some people change their minds across frontiers; other hover there irresolute. The same forces, which need study anew at each election, finally attract or repel a balance of people of both kinds in one direction rather than the other across each frontier.

The importance of the circular scale, of the enlarged battery of pigeon holes which it presents for housing answers to the question ' how will you vote ? ', lies in its effect on subsequent analysis. As long as undecided voters are not correctly differentiated into distinct groups the next steps in the preparation of an election forecast cannot be entirely valid. Practice has been to allocate as many of them as possible on the basis of their leanings. The remainder are then divided in the same proportion as those already attributed to each of the contesting parties, or, what comes to the same thing, the remainder are eliminated.[1]

---

[1] Hadley Cantril ' Polls and the 1948 U.S. Presidential Election ' ; I.J.O.A.R., Vol. 2, No. 3, Fall, 1948.

It is upon this second step that criticism may be concentrated. For, in the light of what has just been said, the residual group of undecided respondents cannot be disposed of uniformly. At one election it may largely consist of people who are genuinely undecided for which of two major parties to vote; this was probably the case in the United Kingdom in 1945. At another, it may consist predominantly of deserters from one particular camp who could not conceive themselves as voting for its principal rival; this appears to have been the case in the United States in 1948. The Michigan findings suggest that of the undecided who subsequently voted, two supported Truman for every one who turned to Dewey; this Democratic advantage might have shown up even more strongly had the leaners first been distributed. The polling agencies, however, had allocated them—never less than 8 per cent of the voters—in the same proportion as respondents with decided intentions had divided; that is, slightly in Dewey's favour.[1]

Had the undecided voters been considered as falling into three main groups on a circular, not linear, scale, this mistake could have been avoided. For, as hindsight showed, those who were undecided right up to November 2nd included a significant number of Democrats of the Roosevelt era who were reluctant to associate themselves with what they considered was Truman's poorer candidature until a late stage of his plucky campaign; they also included many liberals who could not make up their minds until the last moment whether to waste their votes on Wallace or return to the Democratic fold under Truman's banner. It would seem that in the particular conditions of 1948 few of the undecided conceived their choice as being between Dewey and non-involvement. Correct allocation of each sub-group of undecided voters would have given a majority of them all to Truman.

There is no reason to suppose that a parallel situation might not be overlooked by pre-election polls on a future occasion in the United Kingdom, however self-evident it may later appear in retrospect. Who are the people who declare themselves undecided to-day ; who, for that matter, are responsible for the reported Conservative lead of 13 per cent in February 1951 ? It may not be practicable to submit every respondent to an intensive interrogation but the alternative of depending largely on answers to the one question ' how will you vote ? ' is dangerously crude and may lead to an invalid assessment of a forthcoming vote.

(*d*) *Adjustments*

The third stage in the polling process consists of translating sample findings into a forecast of how the national vote will divide on election day. This is equivalent to predicting the condition of the milk in the churn at some later hour on the basis of bacteriological tests performed on a sample drawn from it. Here again questions of validity arise. For the vital point to realise is that when a polling agency makes an election forecast it is not merely describing the stated voting intentions of a representative cross section of the population; it is announcing its own forecast based on those intentions and on other evidence. The scientist is not merely reporting the findings of his milk tests; he is drawing on his general knowledge of organic chemistry, on his knowledge of previously recorded behaviour of milk in a hot climate, and he makes necessary calculations to allow for the passage of time. So with the poll analyst who introduces adjustments of two kinds. First he must correct his quota sample for any distortions so as to make it more truly representative of the population from which it was drawn than it has turned out to be in practice. This static adjustment is intended to correct any residual bias resulting from the quota method of selection or from chance factors. It might, for example, be found on analysing the pre-election sample that only 45 per cent of the interviews turned out to have been with men instead of 50 per cent as intended. If this distortion were ignored the forecast would be biased in favour of the way in which women happen to vote. If this was significantly different from the way men vote then the forecast would err correspondingly. To avoid this happening distortions have to be eliminated artificially and the sample improved either by appropriate counter-weighting of men's and women's interviews or by arbitrary adjustments to the reported party split.

---

[1] S.S.R.C. Bulletin, No. 60 ' The Pre-Election Polls of 1948,' by Frederick Mosteller and others.

In this connection the adjustment which Dr. Gallup introduced to improve his samples in 1948 is of interest.[1] For reasons already explained his quota sample was thought likely to under-represent the lower income and education groups in the American population. Personal judgement coupled with past evidence suggested that the education bias could be eliminated by reducing Dewey's crude percentage by 2.5 and increasing Truman's by 1.3. Dr. Gallup's sample also showed a bias when his respondents were tabulated according to their stated past voting behaviour. More of them said they had voted for the Republican party in previous elections than should have been the case; this suggested that past Republicans had been over-represented. It was thought that this bias could be eliminated by a compensating reduction of Dewey's percentage by 1.2 and an increase in Truman's of 0.8. These two corrections, not being independent, were averaged; Dr. Gallup's final adjustment for sampling was to subtract 1.8 per cent from stated support for Dewey and to add 1.1 per cent to that for Truman.

The British Institute of Public opinion made a sampling adjustment of a rather different kind in 1950 to allow for Liberal intervention. Theoretically it could have happened that the random sampling points throughout the country at which interviews were to be taken all fell within constituencies not challenged by the Liberal party or by any other minor party. As a result, the poll would have shown no Liberal or minor party support in the country at all. Alternatively, too many sampling points might have fallen within Liberal strongholds, thus over-representing Liberal support. Safeguards were of course introduced against extreme cases like these by a certain amount of purposive selection of the sampling points. It is said, however, that Dr. Durant felt obliged, on examining his sample closely, to reduce Liberal support by an arbitrary 1 per cent.

---

[1] Report on the Analysis of Pre-Election Polls and Forecasts, by the special committee appointed by the S.S.R.C. ; reprinted in P.O.Q., Vol. 12, No. 4, Winter 1948–1949.

Secondly, the polling agencies introduce dynamic adjustments when projecting their findings forward to election day. This rounds off the analogy with the sampling of milk in a hot climate. Between the time of testing and consumption the milk will have continued to undergo bacterioligical changes. The forecast has to take such changes into account. The polling agencies are likewise affected by the hot climate of an election campaign and must allow for intentions being changed. Strictly speaking, evidence for this purpose can come only from the successive reinterviewing of a fixed panel of respondents. This is beyond the scope of quota samples alone; even a series of pre-election quota sample polls cannot discover gross shifts of support although net shifts may become apparent. But Dr. Gallup has in fact relied on external evidence, part of it collected by himself from special panels which he has organised on the side, part the result of others' research. Some of the latter may have been responsible for misleading the American polling agencies in 1948 into discounting the effects of, in the first place, inter-party shifts. For a study in Eire County, Ohio, in 1940 suggested that although individual intentions do change during an election campaign they tend, by the time election day arrives, to have returned to where they started or to cancel one another out; they might, therefore, safely be ignored.[1] The Michigan evidence of 1948 suggests otherwise. In the second place the polling agencies have to guess how their undecided respondents are going to divide their support. The problem of undecided voters has already been discussed at length. It is proper to point out here, however, that this is the most important projection of all those to be made because of the large number of respondents involved. Thus Dr. Gallup's latest pre-election poll in 1948 still showed 15 per cent as undecided; its British counterpart in 1950 still showed 8 per cent as undecided. In each case the polling agency allocated about half the people in these groups on the basis of their leanings, the remainder on more questionable assumptions. Finally the polling agencies have to guess what the turn-out will be on election day and adjust their forecasts accordingly. This is more important in the United States where turn-out is lower and margins of variation wider. But in both countries the turn-out adjustment has to be made for the same reason, already discussed, that variations in turn-out affect the support for one of the two major parties more than that for the other. The American Presidential election of 1944 provides a forceful illustration of the application of a turn-out adjustment. Using outside evidence, largely from the Congressional elections of 1942, Dr. Gallup estimated that 40,000,000 votes would be cast. He did not believe his early pre-election polls which told him that rather more people than this had positive voting intentions, and so he subtracted a net 2 per cent from his apparent Democratic support before publication.[1] In general, however, turn-out adjustments are dangerous and, where possible, avoided; weather factors may anyway completely belie them.

---

[1] P. Lazarsfeld and others 'The People's Choice'; Columbia University Press.

V. CONCLUSIONS

In sum, all these adjustments make it plain that there is a considerable difference between the findings of the public opinion poll on voting intentions and the election forecast published by the polling agency. Blame or praise for the accuracy of the forecast does not only rest upon the veracity of respondents or the reliability of the sample survey technique. Much of it rests with the polling agencies whose judgement determined the direction and scale of their various adjustment.

One important conclusion follows from this. The pollers advertise their election forecasts as the main public audit of their work at large. They argue that if their election forecasts are shown to have been accurate within a few percentage points then so will be the results of their various other polls of public opinion for which there is no outside confirmatory check from time to time. This is not true. The same sort of adjustments are not appropriate to their findings on other issues; nor are they applied. The polling agencies' claim would only be valid if they published figures telling how their cross-sections actually said they would vote at a forthcoming election and if those intentions subsequently equated with results. It may be doubted whether such an equation would ever be satisfied. Any comfort which the polling agencies derive from the accuracy of their election forecasts has no reason to extend to their polls on other issues.

But to have reached this conclusion is not to dismiss public opinion polls on issues other than elections as valueless. That is far from the case, especially on those topics about which little is known and for which a high degree of accuracy is not essential. Nor is it to discredit the findings of other types of sample survey. There are alternative methods of sampling a population than by quota controls; methods which ensure a more accurate cross-section and which can prescribe the degree of confidence with which the sample findings may be held to apply to the whole population. Besides, there are characteristics of a population, statements of fact as in a census for example, which may be collected even from a quota sample with a greater degree of confidence than may statements of opinion. And voting intentions are exceptional in being related to behaviour at some future time; most characteristics with which sample surveys deal relate to the instant and do not require validation in a future context.

[1] See Hearings, Committee to Investigate Campaign Expenditures, House of Representatives, December 28th, 1944; H.Res. 551.

Finally, to suggest, as this article has tried to do, that election polls are more fallible, and hence less to be trusted, than their apparent accuracy in the past would indicate is not to condemn even them as valueless or misleading. Intelligently interpreted and accepted with reservations their findings to-day represent the most reliable guide the public has of how a forthcoming election will be decided. A series of pre-election polls can, moreover, be relied upon to report the direction of any changes in party support even though the measure of those changes may not be accurate. No other methods of election prediction deserve as serious attention as do the public opinion polls.

H. FIELD.

SOME NOTES ON ENGINEERING EARNINGS

In a previous article (*Earnings in Engineering*, 1926–1948, BULLETIN, June 1951) we discussed at some length differences in the average earnings of different categories of workers in the engineering industry between 1926 and 1948—a period in which many changes took place, especially during the second war. We now amplify with two short notes on average earnings, the first of which gives some comparable detail for 1906, while the second shows monthly fluctuations for a single district during and after the second war.

1. *A comparison with* 1906

In this section we attempt to measure, against the standard of 1948, changes over a longer period including both wars. To do this we must make use of the 1906 *Board of Trade Earnings Enquiry*, the most detailed survey of earnings yet published in this country. Since the year 1906 falls more or less within the period of ' modern ' industrial techniques, there should not be too many changes in the definition of occupations; and yet the statistics of 1906 describe the conditions of the pre-war generation in a year when unemployment was not severe.

The most obvious difference between the wage situation in engineering in 1906 and that in 1948 lies in the relation between rates and earnings. In 1906, rates appear to have been very close to average earnings. This has not been so since the first war, and the divergence has increased considerably. (Thus wage negotiation based on rates was more realistic then than it is today).

In Table I we compare the average earnings of adult male workers in a few occupations with those of fitters, and give the relative average earn-

TABLE I. *Occupational*[1] *Differentials in Earnings*

Occupation	*Occupational differentials*		*Relative earnings of time-and P. by R. workers*		*Proportion of P. by R. workers*	
	occupational av. weekly earnings as % of fitters' (time- and P. by R. together)		P. by R. av. weekly earnings as % of time-workers		P. by R. workers as % of total number of workers	
	1906	1948	1906	1948	1906	1948
Moulders	100.5	105.3	104.4	120.8	24.4	68.7
Pattern-makers ...	103.3	104.2	—	108.1	nil	54.5
(Turners)	(102.3)	(100.0)	(115.3)	(111.7)	(38.6)	(74.0)
Fitters[2]	*100.0*	*100.0*	115.1	106.8	29.8	60.8
Platers, riveters, caulkers	112.4	100.0	124.5	111.8	41.2	61.8
(Machinemen) ...	(82.6)	(92.2)	(114.4)	(120.4)	(47.4)	(84.5)
Labourers	61.7	79.1	120.3	109.8	8.6	22.6
All above workers ...	—	—	124.3	116.5	35.8	58.5

[1] We have taken as many occupations in the 1906 Enquiry as seemed comparable with our own data for January 1948. ' Turners (other than brass) ' are taken as roughly comparable with ' Turners and machinemen rated at or above fitters' rate ' ; and ' Machinemen ' with ' Turners and machinemen rated below fitters ' rate '.

[2] Fitters' average weekly earnings (time and P. by R. workers together) were 36.3 shillings in 1906 and 146.6 shillings in 1948.

ings of time-workers and payment-by-results workers, together with the proportion of P. by R. workers.

Any occupational comparisons over these 42 years are bound to be crude, and, since these are intended to indicate only the general pattern of change, there seems no point in laboriously justifying them. The earnings status of the semi-skilled (taking ' machinemen ' as representative) and that of the unskilled have of course considerably improved, as compared with that of skilled workers generally. However, the experience of the different skilled groups has not been uniform. Moulders appear to have improved their position; that of patternmakers has remained more or less stable; while that of platers, riveters, and caulkers has markedly deteriorated. These differences are to some extent explained by the differences in time- and P. by R. workers' earnings. The pieceworking plater in engineering was very well paid in 1906—possibly because of the high earnings of platers in shipbuilding. By 1948 however the pieceworking plater's position had declined. Fitters' P. by R. earnings have also declined, but those of moulders—and to a less extent those of machinemen—have risen considerably. The number of workers on P. by R. has, of course, grown greatly in all categories—even the patternmakers have accepted P. by R. methods in the interval—though for some groups it was surprisingly large in 1906.

In Table II we attempt a comparison of inter-area differentials in average earnings, and give, for different areas the relative earnings of timeworkers and P. by R. workers, together with the proportion of P. by R. workers.

TABLE II. *Area*[1] *Differentials in Earnings*[2]

Area	*Area differentials* average weekly earnings as % of average for all U.K.		*Relative earnings of time-and P. by R. workers* P. by R. average weekly earnings as % of time-workers		*Proportion of P. by R. workers* P. by R. workers as % of total number of workers in each area	
	1906	1948	1906	1948	1906	1948
East and West Midlands	100.5	106.6	115.9	115.2	27.6	58.4
London	115.2	105.4	111.6	110.3	40.4	52.3
South'n and West'n Area	101.3	97.2	117.3	113.5	28.6	57.6
North-East Coast ...	105.5	96.9	118.0	117.1	23.6	51.9
Lancs. and Cheshire and North-West Coast ...	100.0	96.3	117.8	115.1	35.8	62.3
Scotland	97.9	94.2	130.2	116.8	20.6	54.5
Yorkshire	92.9	92.2	118.0	113.4	16.6	55.2
All U.K. (incl. areas not specified)	*100.0*	*100.0*	119.4	113.7	27.4	57.3

---

[1] The designation of areas is the same as that of the previous article, except that South Wales has been omitted from the Western Area, and that certain areas have been grouped. By this means a rough comparability has been achieved.

[2] Average weekly earnings and numbers of workers used in compiling the table were, in 1906, for all workers covered by the Enquiry in each district (the districts being grouped into the above areas) ; and, in 1948, for the 9 occupational groups used in the previous article. The average weekly earnings (time and P. by R. together) for the U.K. were, in 1906, 31.9 shillings, and in 1948, 139.6 shillings.

This picture, though rough, probably corresponds to the general trend of events. As regards average earnings, the most striking feature has been the decline of London from its privileged position. This decline—not fully compensated for by the rise of the Midlands—has resulted in a certain narrowing of the spread of average earnings as between areas,[1] although there has been some persistence in their relative positions. The rise of the Midlands reflects the relative expansion of motor engineering (the North East Coast, a heavy engineering area, has been left behind); while the loss by London of its traditional position may be partly due to the attempts made during the period to level up wages in the different regions. Thus the changes between the two dates suggest two conflicting tendencies: the first towards greater regional uniformity in wages—a tendency operative at any rate in relation to London, the most obvious historical example of disparity—and the second a tendency towards new disparities induced by the development of new branches of engineering.

The percentage by which P. by R. workers' average earnings exceed those of timeworkers has diminished in all areas. At each date this percentage seems to have been fairly uniform as between areas—London's being rather low. (The high percentage shown for Scotland in 1906 is probably connected with the high relative earning capacity of P. by R. workers in Scottish shipyards at that period). The proportions of workers employed on P. by R. systems in the different areas were much more alike in 1948 than in 1906—the use of these systems having developed greatly in the interval. The proportion for London in 1948 again seems rather low—although P. by R. was already well established there by 1906. By contrast, there has been a marked change in this respect in Yorkshire.

Thus between 1906 and 1948 rates have become a much less adequate guide to earnings; there has been a general decline in the skilled worker's relative earnings position (though different skilled groups have fared differently in this respect); the importance of semi-skilled work and of P. by R. has grown (although the relative earning advantages of P. by R. workers have diminished); and regional divergences in earnings have persisted.

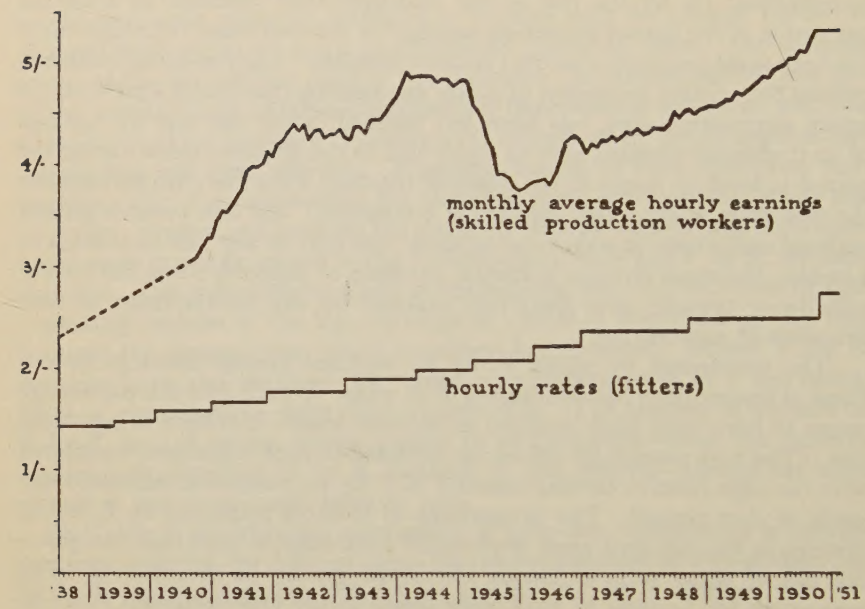
2. *Monthly fluctuations in one district*

In the accompanying graph we show, for a district which had very high average earnings in 1948, the fluctuations between 1940 and 1951 in (monthly average) hourly earnings of skilled production workers—skilled fitters, skilled turners, and skilled machinists generally (timeworkers and P. by R. workers together). The figures on which the graph is based were originally collected to provide a standard for the adjustment—after a time-lag of three months

---

[1] In 1906 average earnings in only two of these seven areas fell below the general average for the United Kingdom, while in 1948 in only two areas were average earnings above the general average. This is not due to the omission of certain areas—in neither year, probably, did the omitted areas account for as much as 10 per cent of total workers—but to the fact that the proportion of workers in the two areas of lowest earnings had almost halved, while in the two areas of highest earnings it had about doubled during the period. Such was the effect of the 'drift to the South'.

Hourly rates & earnings in one district



—of the earnings of skilled toolroom operatives. A figure of average hourly earnings for July 1938 (fitters only) is given from our previous data.[1] We also show the changes in the time rates of fitters in the same district.

The graph makes clear the dangers of thinking of time rates and earnings as synonymous. In this district over the period, the hourly earnings of skilled workers were sometimes more than twice as high as their rates, and there was always a big gap between the two. Moreover the gap between the weekly pay-packet and the standard weekly rate was, during the war at least, considerably wider than can appear from a comparison of these hourly data, since extensive overtime was being worked. (Conversely, the comparatively small extent of short time working after the war meant that the gap between actual weekly earnings and rates was a little narrower than appears here.) While rates moved slowly upwards throughout, earnings moved irregularly and fluctuated from month to month. If we take the three main periods of change—war, transition, and post-war—we see that earnings in both war and post-war periods of expansion were increasing faster than rates, particularly during the war, while in the transition period earnings fell steeply although rates continued to rise (Table III).

---

[1] A figure obtained by dividing average weekly earnings by average hours worked will of course be affected by the ' overtime component ' in the weekly figures : *i.e.*, if overtime —which is paid for at an enhanced rate—is being worked, the figure of hourly earnings will be inflated. However, the figure for July 1938, though obtained in this way, is not greatly inflated, since fitters were working little overtime at this date. The series from 1940 to 1951 appears to have been based on earnings for a standard week, excluding overtime (*cf.* the engineering agreement of June 4th, 1940), and should thus be directly comparable with figures of hourly rates.

TABLE III

Changes in the Levels of Rates and Earnings of Skilled Production Workers in One District

Period[1]	*Percentage increase or decrease*			
	rates		*earnings*	
	(*a*) during each period	(*b*) monthly average of (*a*)	(*c*) during each period	(*d*) monthly average of (*c*)
War				
July 1938 to 1944–45	+37%	+0.5%	+109%	+1.4%
Transition				
1944–45 to 1945–46	+ 5%	+0.7%	—21%	—2.9%
Post-war				
1945–46 to March 1951 ...	+31%	+0.5%	+ 38%	+0.6%
Whole period				
July 1938 to March 1951 ...	+88%	+0.6%	+129%	+0.8%

[1] It will be seen from the graph that the fall in earnings at the end of the war was preceded and followed by periods of relative stability. To avoid an arbitrary choice of particular months as turning-points, we have taken six-month averages during these periods of relative stability in earnings when rates were also stable. Thus ' 1944–45 ' covers October 1944 to March 1945, and ' 1945–46 ' covers September 1945 to February 1946. The 'monthly average' figures in Columns (*b*) and (*d*) are calculated for the periods of change only, *i.e.*, from July 1938 to October 1944, from March 1945 to September 1945, and from February 1946 to March 1951.

Since rates tend to remain the same for many months, and to be altered at irregular intervals, it is difficult, in selecting periods, to avoid presenting somewhat arbitrary percentage increases between any two dates. For instance, the monthly average figure of 0.7 per cent for the ' transition ' period is too high, because of the fact that this period is a short one relative to the time elapsing between successive wage changes around that date, and yet contains a wage increase. Nevertheless the monthly average increase in rates over the whole period has been fairly constant between 0.5 and 0.6 per cent. But since 1946 wage changes have tended to take place at longer intervals (in view, for instance, of the wage ' freeze '), and have been of a somewhat different character from the war-time changes. The change of January 1947, which increased the hourly rate and left the weekly rate unaffected, was due to the reduction of hours from 47 to 44; that of October 1948, while including a bonus award, involved the establishment of national minimum basic rates; and that of November 1950 gave larger increases to the skilled than to the unskilled, and was an automatic increase only to those whose earnings fell below specified levels.

It is not possible to account precisely for the large movements in hourly earnings without much more detailed information than is available. Variations in overtime, which might seem at first sight to be a convenient explanation, appear to be precluded in this case by the nature of the figures. The explanation is likely to lie in (1) changes in additional rates or bonuses paid in excess of the prevailing district rate, but not directly related to output; and/or (2) variations in payment by results. It is probable that the practice of paying additional rates has grown, especially during the war. (This seems to be corroborated by a considerable widening of the gap between timeworker's hourly rates and their earnings). P. by R. earnings may vary for several reasons. Individuals' efforts will vary; and some of the exceptional war-time rise, the levelling-off at certain times, and the end-of-war fall must be explained in this way. P. by R. prices may be fixed ' loosely ' or ' tightly '; when production is all-important the price to obtain it is likely to be ' loose ', and in any case the unfamiliarity of wartime needs makes accurate pricing difficult. Again, P. by R. earnings, which are favoured by long production runs, are disturbed by breaks in routine; the fall in 1945 must be partly due to this. Finally, a long-run growth in technical efficiency means improved earnings, if P. by R. prices remain unchanged.

In fact, the course of earnings is subject to change and sensitive to the influence of external events in a way in which the relatively infrequent stepping-up of rates is not.

It is not, of course, to be assumed that all firms in the district necessarily paid such high wages; indeed, there are likely to have been wide differences in the earnings of skilled workers between (and even within) the various firms. It has not been possible to obtain information on this point for the district in question, although some evidence can be given for a district which also had very high average earnings in 1948—and which is geographically near, and industrially similar, to the district quoted. Here, the average hourly earnings of P. by R. workers in one highly skilled category in 4 factories varied in a recent week between 3.9 shillings and 5.5 shillings; and among semi-skilled machinists in the same factories the spread was from 3.4 to 4.5 shillings. (The lowest level of semi-skilled average earnings in these four factories was higher than the average for skilled workers in two other factories for which we had information.) It seems evident that a study of inter-firm differences in the wages of comparable grades of workers would show big variations in average earnings.

K. G. J. C. Knowles.
D. J. Robertson.